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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/425,234	10/25/1999	HAMID RABIE	4320-91	9266
1059	7590	12/02/2004	EXAMINER	
BERESKIN AND PARR SCOTIA PLAZA 40 KING STREET WEST-SUITE 4000 BOX 401 TORONTO, ON M5H 3Y2 CANADA			MENON, KRISHNAN S	
			ART UNIT	PAPER NUMBER
			1723	

DATE MAILED: 12/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/425,234

Applicant(s)

RABIE ET AL.

Examiner

Krishnan S Menon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 27-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 27-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

Claims 1-17 and 27-38 are pending.

#### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-17 and 27-38 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-25 of copending Application No. 10/377,647 and claims 1,3, and 6-61 of copending application 10/461,687. Although the conflicting claims are not identical, they are not patentably distinct from each other because all the claims recite methods of cleaning a membrane using cleaning chemicals with obvious variations in cleaning agent concentrations and/or the number of cleaning cycles.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-15 and 27-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al (US 5,403,479) in view of applicant's admission of known prior art.

**Claim 1:** Smith teaches a method of cleaning membranes immersed in water (abstract, figures) comprising performing one or more cleaning events per week (Fig 4,6) having steps of stopping permeation, flowing a chemical cleaner through the membrane in the reverse direction of permeate flow, resuming permeation, with the weekly CT being between 2000 and 30,000 min.mg/L (table line 9: 100 ppm (NaOCl) \* 60 min = 6000 min.mg/L; col 11 line 30-35: duration about 1 Hr; col 15 lines 34-36: concn. At 10 ppm), wherein the cleaning events reduce the rate of decline of the membrane permeability (col 11 line 20 – col 13 line 5). The CT values also are only result effective variables optimizable depending on the degree of fouling of the membranes due to feed water quality, quantity, and the process flow rate. Discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. In re Boesch and Slaney, 205 USPQ 215 (CCPA 1980); In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977); In re Aller, 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955). (See also Smith col 19 lines 5-13)

Smith does not teach the definition of CT as in claim 1(c)(i). However, this is only a mathematical expression of the measure of concentration of the cleaning solution,

times the duration of cleaning cycle, for the convenience of the inventors, and is not a patentable limitation.

Smith teaches about performing recovery cleaning by the prior art methods in "Background of the Invention". More importantly, Smith teaches the first cleaning (or, the intensive recovery cleaning) as defined by the applicant in the specification (page 3 second para, referencing US 5,403,479, in col 19 lines 27-30). Smith also teaches the method of back-flushing with a cleaning solution, or the "in-situ cleaning", which is like the "cleaning events". In addition, Smith teaches "cleaning events" having varying degrees of intensity as best exemplified in fig 4. (see smith figures, abstract, col 11 line 22 – col 12 line 25, col 19 lines 5-47). Smith also teaches a method of infrequent harsh cleaning with more frequent back-flushing in lines 18-30, col 9.

What Smith does not expressly teach is performing the "first cleaning" from time to time, with more frequent "event cleaning" in between, as in claim 1, in that particular format. Applicants' own admission of 'known process for cleaning membranes' teaches these steps in the specification pages 1-3 (Background of the Invention), especially page 2 lines 6-7. It would be obvious to one of ordinary skill in the art at the time of invention to modify the methods taught by Smith with the 'known process' of cleaning the membrane as taught by the admission of prior art by the applicant for more effective cleaning. Smith provides sufficient disclosure for the first cleaning in the form of methods taught by prior arts and his own inventions. One skilled in the art could pick cleaning methods of varying intensity just from Smith's own inventions, because the

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disclosure of the first cleaning, or the "intensive/recovery cleaning, provided by the applicant is from Smith's invention (see specification page 3 lines 7-14).

With regard to the periodicity of cleaning events (newly added in the amendment of 6/4/04), Smith teaches periodic cleaning in col 1 lines 6-31, and Smith's development of the cleaning method is for periodic cleaning of the membrane.

**Claims 2-4:** Smith teaches processing waste water (abstract), and ground water (col 20 lines 35-40) which is well known for drinking. Re the CT values, in these claims, it is only a result effective variable optimizable depending on the feed water quality, quantity, and the process flow rate. Discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. In re Boesch and Slaney, 205 USPQ 215 (CCPA 1980); In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977); In re Aller, 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955). (See also Smith col 19 lines 5-13)

**Claim 5** adds additional limitations of pulsed flow for the chemical cleaner and a wait period with the pump off for the chemical cleaner to 'clean'. Smith teaches pulsed flow (col 11 lines 35-50), and the need for soak periods (col 14 lines 55-68), or blocking the flow of solution in col 12 line 68 – col 13 line 5, and the details and the need for of pulsing in col 16 line 60 – col 17 line 6. One of skill in the art could optimize the length of pulse and wait periods depending on the nature of water treated (In re Boesch).

Re the newly added limitation (amendment of 6/4/04), Smith teaches one or more membranes arranged into one or more modules with permeate side of the membranes a space in communication with headers – see figures, especially, Fig 2. In

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step (b), chemical cleaner reaching the header would remain in the header or flow in a direction opposite to the normal permeate flow direction – which is the back-flush mode, and Smith teaches this in col 11 lines 22-60.

**Claim 6** adds the more intensive cleaning as being 15 days apart, which is a result effective variable (In re Boesch...)

**Claims 7-10:** the weekly CT values are result effective variables as discussed in claims 2-4 above.

**Claims 11-12:** the time duration of the pulse and wait are, again, result effective variable (In re Boesch..)

**Claim 13:** pulses selected to provide chemical cleaner in an area in the membranes and in an area in tank water adjacent the outside of the membrane: see Smith abstract re the fouling film formed on the outside surface of the membrane, and col 14 lines 33-68 re effect of the cleaning solution on the fouling biofilm.

**Claim 14:** the pulsing pressure is in the range as in claim 14, since Smith uses min 100 kPa *absolute* pressure (Smith says this as 1 bar or at least 0.1psig, which means the 100kPa is absolute pressure). Since 5 – 55 kPa is above the pressure on the outside of the membrane (which at least would be one atm, or about 1 bar), the pressures are within the same range.

**Claim 15:** the flow rate of the membrane should be inherently the same in Smith, since Smith uses similar membranes (UF or microfiltration – see abstract). Under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to

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be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986)

**Claim 27:** all the limitations of claim 27 are already discussed in claims 5-7, except the chemical cleaner concentration between 20 and 200 mg/L and the time period of 10-100 min. Smith teaches these in col 11 lines 32-35 and the table in col 15 at line 9.

**Claims 28-30:** CT values – result effective variable (In re Boesch)

**Claim 31:** Smith teaches the membrane as immersed in water, outside of the membrane is in contact with water containing solids and there is no agitation (see abstract; col 1 lines 33-66 and col 2 lines 62-65).

**Claim 32:** see rejection of claim 6

**Claim 33:** the performance recovery in the membrane by the cleaning is at least to 70% of the initial flux in Smith (see abstract).

**Claim 34:** the membrane is hollow fiber ( col 15 lines 48-62).

**Claim 35:** Smith does not teach any agitation.

**Claim 36:** Flowing chemical cleaner by introducing chemical cleaner to the flowing water – see figures. Smith provides cleaning chemical in a tank which is flowed through the system, in water, which is equivalent to what is claimed.

**Claim 37:** cleaning at regular intervals and each having the same CT: optimizing a result effective variable, In re Boesch...

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2. Claims 16, 17 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al (US 5,403,479) in view of applicant's admission of known prior art, and further in view of Kawanishi et al (US 5,647,988).

Smith in view of applicants' admission of known prior art teaches all the elements of claim 5. Claims 16 and 17 add the further limitation of removing the chemical cleaner through a drain in the tank. Smith teaches that draining the tank would be unnecessary because the amount of cleaning agent discharged would be insignificant to the volume of water treated (col 11 lines 50-60). However, Kawanishi teaches draining after cleaning (col 1 lines 15-63). It would be obvious to one of ordinary skill in the art at the time of invention that when excessive amounts of cleaning agents are used, it would be better to drain the tank in the Smith's teaching to eliminate any possible adverse effects of the cleaning chemical in the filtrate, as taught by Kawanishi.

**Claim 38:** replacing some or all of the water in the tank with feed water between step (B)(b) and (B)(c): since the step (B)(c) after step (B)(b) of claim 1 is resuming permeation, one would be constantly replacing the water in the tank to replace the water taken out in the permeate. Smith teaches that by his method, draining the tank becomes unnecessary (col 11 lines 50-60) because the amount of cleaning chemical discharged in to the tank is insignificant compared to the volume of the tank. However, if reducing the level of cleaning chemicals introduced into the water becomes necessary because of any reason, one of ordinary skill in the art would obviously drain the tank, as taught by Kawanishi (col 1 lines 48-63).

### ***Response to Arguments***

Applicant's arguments filed 10/22/04 have been fully considered but they are not persuasive.

Applicants' response to the Double Patenting rejection,

*"The Applicant's note the provisional obviousness-type double patenting rejection made in the Office Action. The Applicants will respond to this rejection when claims of either Application No. 10/377,647 or 10/641,687 are allowed."*

is not fully responsive because this would hinder the continued prosecution of the applications concerned as they get tied into one another, especially for allowance or appeal. Applicants must do one of traverse the double patenting rejection, issue a terminal disclaimer, cancel the claims rejected, or amend the claims to overcome the double-patenting rejection. See MPEP 714.02.

In response to the argument, "... However, the Office Action alleges that pages 1-3, especially page 2, lines 6-7, of Applicants' specification teach such a combination. Page 2, lines 6-7 refer to a combination of "periodic regular cleaning" and "intensive recovery cleaning". Periodic regular cleaning is then further described on page 2, lines 8-19 as backwashing the membranes with air or water under pressure to physically push solids off the membranes. Accordingly, a physical, not chemical, method as described...", re claims 1 and 27: Applicants acknowledge here that the first cleaning and the periodic cleaning events are prior knowledge. The argument that the cleaning events acknowledged are not chemical cleaning events is not relevant because the claims do not recite that they are chemical cleaning events, even if the sum of the CT's

over a week are recited. More over, even if they are so recited, it still would be obvious to one of ordinary skill in the art from the Smith ref, because Smith ref teaches various methods of cleaning with carrying intensity, and one could adapt any of these for the event cleanings. With re to the periodic cleaning, there is nothing in the Smith ref that would make one of ordinary skill in the art to believe that it is not for periodic cleaning of membranes.

Arguments re claim 5: the pulsing flow has been discussed in detail in the past office actions. With re to the chemical cleaner flow in the lumen of the membrane, there is nothing in the Applicants' disclosure that is different from the Smith ref to warrant that the chemical cleaner would not remain in the enclosed space of the module or flow through the membrane walls in the Smith ref. It is inherent.

Arguments re Claims 16,17 and 38: Kawanishi teaches draining the tank and backwashing the membrane with chemical cleaners as known in the background section.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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